

DRIVE

Monthly eNewsletter

Published by:

CHARUTAR VIDYA MANDAL'S

S.G.M. English Medium college of Commerce &
Management

SEMCOM



VISION: *To contribute to the societal enrichment through quality education, innovation and value augmentation.*

MISSION: *To build up a competitive edge amongst the students by fostering a stimulating learning environment.*

DREAM: *To establish a unique identity in the emerging global village.*

GOALS:

- *To focus on integral development of students.*
- *To offer courses and programs in tune with changing trends in the society as a whole.*
- *To update the curriculum as per the need of the business and industry.*
- *To create unique identity in the educational world at the national as well as international level.*
- *To institutionalize quality in imparting education.*
- *To incorporate innovations on a continuous basis in the entire process of education at institutional level.*
- *To create platform for the students for exhibiting their talent and for development of their potentials.*
- *To generate stimulating learning environment for students as well as teachers.*
- *To build cutting edge amongst the students to withstand and grow in the competitive environment at the global level.*

The overall mission is reinforced by the Punch Line

“WHAT WE THINK, OTHERS DON’T”.

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Editorial Board:

Dr. Waheeda Thomas	Chief Editor
Dr. Nishrin Pathan	Managing Editor
Mr. Sunil Chaudhary	Executive Editor
Ms. Reshma Pathak	Technical Editor

FROM THE CHIEF EDITOR'S DESK:

The modern business scenario characterized by globalization, information technology revolution with increasing usage information communication technology has drastically changed the business and academic landscape. E-learning has already started spread education across the globe. Teaching pedagogy is undergoing transformation with more usage of Information and Communication Technology tools.

E- Commerce be it business to business, business to consumer, business to business to consumer, consumer to consumer has drastically changed the way business is done, with direct marketing and online marketing gaining more prominence. Mobile Commerce with the usage of mobile phones connected by internet for doing various transactions be it ticket booking for railways or air lines, movie ticket booking to buying various goods and services online emphasizes the development of Mobile Commerce.

The current issue features article on Supervised Learning. The Supervised Learning is the task of identifying a function that best fits the given data. The input set consists of input values which are used for training the model/formula and it also consists of the expected output for each input.

There is an article on Product differentiation and branding: The key to marketing success highlighting the pivotal role of product differentiation and branding to marketing success. In the present era of globalization, with intense global competition for markets, product differentiation and branding become more critical to marketing success. Product differentiation based on unique innovative product features, quality, durability, styling, purity, freshness, environment friendly or green product enables the business firm(s) to effectively face competition.

Another article on Basics of taxation clarifies the basic concepts of taxation. There is an article on E-Certificate. An Issue of an E-certificate to qualified candidates is new trend adapted by many educational and business organizations. The most prominent advantage of e-certificate is fast delivery. It can be delivered through mail services such as Yahoo-Mail, through messaging services such as WhatsApp or through organization's Website. E-Certificates are issued via electronic files (usually, PDF), with digital signatures issued by a third party trusted organization. The digital signature certifies that the electronic file has not been altered in any way during storage and transmission. Another article is on Real Time Location System. Real Time Location System (RTLS) allow you to locate people or things in real time, enables you to track, manage and analyze information regarding where assets or people are located. Assets are like vehicles, machinery, projectors and other equipment's. Track people and objects at local, national or even global level.

ISSN NO 2277 2510

Information Communication Technology has drastically changed the business landscape with increasing usage of information technology in various facets of business be it customer relationship management, supply chain management, e-commerce, sustainable development to mention a few.

By:

Dr. Waheeda Thomas
Principal
SEMCOM.

IQAC Corner:

Research Article:

Abstract:

Information and Communication Technologies (ICTs) are referred to as the collection of technological equipment and resources which are made use of to communicate. They are also made use of to generate, distribute, collect and administer information. ICT is a force that has changed many aspects of the way we live. Introducing ICT as a tool to support the education sector has initiated substantial discussions since the late 1990s. During the last few years an increasing number of international development agencies have incorporated the potential of ICT to support the education sector. This article is focusing on role of ICT for quality higher education.

Introduction to ICT:

Information and Communication Technologies (ICTs) are referred to as the varied collection of technological equipment and resources which are made use of to communicate. They are also made use of to generate, distribute, collect and administer information. ICT is a force that has changed many aspects of the way we live. Information and Communication Technologies consist of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. ICTs can be divided into two components, Information and Communication Infrastructure (ICI) which refers to physical telecommunications systems and networks (cellular, broadcast, cable, satellite, postal) and the services that utilize those (Internet, voice, mail, radio, and television), and Information Technology (IT) that refers to the hardware and software of information collection, storage, processing, and presentation.

Introducing ICT as a tool to support the education sector has initiated substantial discussions since the late 1990s. A decade ago the emphasis was on Technical and Vocational Education and Training and training teachers. During the last few years an increasing number of international development agencies have incorporated the potential of ICT to support the education sector. UNESCO has played a major role in spearheading the Education for all initiative to connect the potential of ICT. The widely subscribed Dakar Framework for Action recognizes that, 'these technologies (ICTs) have great potential for knowledge dissemination, effective learning and the development of more efficient education services'.

When looking at the integration of ICT to support the achievement of educational objectives, it can be found that after almost a decade of using ICT to stimulate development, it is not yet fully integrated in development activities and awareness is still required.

The main objectives of the paper are to evaluate the importance of ICT in higher education and to analyze the government initiatives for development of ICT in higher education.

Trends of Higher Education in India:

Though higher education is very old in India, modern higher education in India began with the establishment of Hindu College in Calcutta in 1817. By 1855, there were 281 High Schools and 28 Colleges. To regulate them, three universities; Bombay, Calcutta and Madras were established in 1857 by the British Indian Government. The growth continued unimpeded and by 1947, there were 19 universities, 496 colleges with 2,40,000 students. University Education Commission, 1948-49 (popularly known as Radhakrishnan Commission) emphasized the need for setting up an apex body to coordinate the growth and development of education at the tertiary level and maintenance of standards in education. Thus, the University Grants Commission (UGC) came into existence by an Act of Parliament in 1956.

In the last five half decades, the growth of higher education presents a very impressive picture. There has been commendable quantitative expansion in terms of students' enrolment, number of teachers, colleges, universities and research degrees.

ICT in Education: an Overview:

The Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer, and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video conferencing and distance learning. When such technologies are used for educational purposes, namely to support and improve the learning of students and to develop learning environments, ICT can be considered as a subfield of Educational Technology. ICTs in higher education are being used for developing course material; delivering content and sharing content; communication between learners, teachers and the outside world; creation and delivery of presentation and lectures; academic research; administrative support, student enrolment etc.

In the current information society, people have to access knowledge via ICT to keep pace with the latest developments. In such a scenario, education, which always plays a critical role in any economic and social growth of a country, becomes even more important. Education not only increases the productive skills of the individual but also learning power. It gives them a sense of well-being as well as capacity to absorb new ideas, increases their social interaction, gives access to improved health and provides several more intangible benefits. The various kinds of ICT products available and having relevance to education, such as teleconferencing, email, audio conferencing, television lessons, radio broadcasts, interactive radio counseling, interactive voice response system, audiocassettes and CD ROMs have been used in education for different purposes (Bhattacharya and Sharma, 2007).

The Four Rationales for Introducing ICT in Education

Rationale	Basis
Social	Perceived role that technology now plays in society and the need for familiarizing students with technology.
Vocational	Preparing students for jobs that require skills in technology.
Catalytic	Utility of technology to improve performance and effectiveness in teaching, management and many other social activities.
Pedagogical	To utilize technology in enhancing learning, flexibility and efficiency in curriculum delivery.

(Source: Cross and Adam (2007))

Today ICTs – including laptops wirelessly connected to the Internet, personal digital assistants, low cost video cameras, and cell phones have become affordable, accessible and integrated in large sections of the society throughout the world. It can restructure organizations, promote collaboration, increase democratic participation of citizens, improve the transparency and responsiveness of governmental agencies, make education and health care more widely available, foster cultural creativity, and enhance the development in social integration. It is only through education and the integration of ICT in education that one teaches students to be participants in the growth process in this era of rapid change. ICT also allows for the creation of digital resources like digital libraries where students, teachers and professionals can access research material and course material from any place at any time (Bhattacharya and Sharma, 2007). Such facilities allow the networking of academics and researchers and hence sharing of scholarly material. This avoids duplication of work.

Benefits of ICT in education to main stakeholders

Stakeholder	Benefits
Students	<ul style="list-style-type: none"> - Increased access - Flexibility of content and delivery - Combination of work and education - Learner-centered approach - Higher-quality of education and new-ways of interaction
Employers	<ul style="list-style-type: none"> - High quality, cost effective professional development in the workplace

	<ul style="list-style-type: none"> - Upgrading of employee skills, increased productivity - Developing of a new learning culture - Sharing of costs and of training time with the employees - Increased portability of training. -
Government	<ul style="list-style-type: none"> - Increase the capacity and cost effectiveness of education and training systems - To reach target groups with limited access to conventional education and training - To support and enhance the quality and relevance of existing educational structures - To ensure the connection of educational institutions and curricula to the emerging networks and information resources, - To promote innovation and opportunities for lifelong learning.

(Source: UNESCO, 2002)

In absence of ICT, most of the responsibility of teaching and learning lies on the teachers. However, with the help of ICT one can transfer the responsibilities to the students so that they can self-manage. It helps to individualize the teaching or guidance method as per the student's need. It also boosts the confidence level and the self-esteem of the students who acquire the ICT skills through the process of being exposed to such kind of learning also puts forth the view that ICT-based registration, evaluation, and administration help to link different levels of information and facilitate an overall view of the whole educational setup. It facilitates the evaluation and examination of the learning process and results by the students and the parent's in a flexible and convenient way. The globalization process has also created a large market of offshore students. To reach them, information technology is the only convenient medium, which can offer education as a service (Bhattacharya and Sharma, 2007). It increases education provision substantially and can contribute to mass education. It also creates competition among the institutions for providing education and hence improves the quality (Cross and Adam, 2007).

Challenges for using ICT in Education:

While using ICTs in education has some obvious benefits, ICTs also bring challenges. First is the high cost of acquiring, installing, operating, maintaining and replacing ICTs. While potentially of great importance, the integration of ICTs into teaching is still in its infancy. Introducing ICT systems for teaching in developing countries has a particularly high opportunity cost because installing them is usually more expensive in absolute terms than in industrialized countries whereas, in contrast, alternative investments (e.g. buildings) are relatively less costly (UNESCO, 2009).

The four most common mistakes in introducing ICTs into teaching are i) installing learning technology without reviewing student needs and content availability; ii) imposing technological systems from the top down without involving faculty and students; iii) using inappropriate content from other regions of the world without customizing it appropriately; and iv) producing low quality content that has poor instructional design and is not adapted to the technology in use (UNESCO, 2009).

Although ICT offers a whole lot of benefits there are some risks of using ICT in education which have to be mitigated proper mechanisms. They are:

- It may create a digital divide within class as students who are more familiar with ICT will reap more benefits and learn faster than those who are not as technology savvy.
- It may shift the attention from the primary goal of the learning process to developing ICT skills, which is the secondary goal.
- It can affect the bonding process between the teacher and the student as ICT becomes a communication tool rather than face to face conversation and thus the transactional distance is increased.
- Also since not all teachers are experts with ICT they may be lax in updating the course content online which can slow down the learning among students.
- The potential of plagiarism is high as student can copy information rather than learning and developing their own skills.
- There is a need for training all stakeholders in ICT.
- The cost of hardware and software can be very high.

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ISSN NO 2277 2510

Title of the Book: Quality Footprints – Sustainable Development of Higher Education Insitutions

Published by SEMCOM,

Vallabh Vidyanagar

Publisher: Lajja Communications

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Machine Learning

Supervised Learning

- The Supervised Learning is the task of identifying a function that best fits the given data. The input set consists of input values which are used for training the model/formula and it also consists of the expected output for each input. The training data contains training examples based on which the system will define a model that will generate the same expected output as available in the training set for the same inputs from the set. This model then can be used with new input values to find the output. There is prior knowledge of what the output will be for the sample data and so it is called Supervised Learning. The algorithm generates predicted output on the data set and the learning is stopped when the model achieves an acceptable level of performance.
- Supervised Learning is typically Classification or Regression type. In classification, the inputs are mapped to outputs whereas, in regression, the inputs are mapped to continuous output. Incorrect/noisy data can reduce the efficiency of the model. The important factors to consider are Model complexity and Bias-Variance tradeoff: Model complexity refers to the complexity of the model to be learnt and depends on the complexity of the training data. If the training data is small in size, the complex model might over fit it resulting in it producing “correct” output only for the sample input set and will not be able a generalized model for unseen data. Bias is the constant error and variance it the amount of change in error which changes with the training data set. Bias and Variance are always opposite and a tradeoff is required based on nature of the problem. A classification problem is when the output can be categorized such as “disease” and “no disease”. A regression problem is when the output is a real value such as “price” or “profit”.
- There are various algorithms available for Supervised Learning. Each one has its own pros and cons. The most widely used learning algorithms are: Support Vector Machines (SVM), Linear Regression, Logistic Regression, Naive Bayes, Linear Discriminant Analysis, Decision Trees, k-Nearest Neighbor Algorithm, Neural Networks (Multilayer perceptron), Random Forests, etc.
- A few application areas of Supervise Learning includes: Bioinformatics, Database marketing, Handwriting recognition, Information retrieval, Information extraction, Object recognition in computer vision, Spam detection, Pattern recognition, Speech recognition, etc.

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By:

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SEMCOM

MY VOICE:

PRODUCT DIFFERENTIATION AND BRANDING: THE KEY TO MARKETING SUCCESS

In the present global business environment characterized by privatization, liberalization, globalization, and intensified competition, business firm(s) scrambles to attract customers, retain customers, use customer relationship management strategies including customer life time value calculation, and focus more on highly profitable customers with strategies like patronage awards, frequency programs, and various financial and non-financial incentives to retain customers. Customer retention is much more economical than attracting new customers. The way to customer retention is consistently aiming for customer satisfaction by offering superior quality products and services with value for money market offering(s) as needed and demanded by the consumers.

Product differentiation is the strategy of differentiating the market offering(s) based on form, unique and innovative features, styling, performance quality, conformance quality, reliability, reparability, after sales service, product warranty from the competitive market offering(s). Product differentiation is more effective with product branding. A brand is a name, term, sign or symbol which is used to differentiate the market offering(s) of the business firm(s) from those of the competitors emphasizing on unique product benefits resulting into brand awareness, brand preference, brand sales and brand loyalty. Branding decisions are critical for the marketing success. Branding strategies including usage of blanket family brand name for all the market offerings offered by the brand sponsor or utilizing separate brand name for individual product items have their pros and cons. Branding offers immense benefits to the brand sponsor:

Branding enables the brand sponsor to create unique image of the brand based on innovative product features, superior quality, durability, after sales service, customer benefits etc. to mention a few. In the present era of globalization, with intense global competition for markets, product differentiation and branding become more critical to marketing success. Product differentiation based on unique innovative product features, quality, durability, styling, purity, freshness, environment friendly or green product enables the business firm(s) to effectively face competition. Branding decisions including decision on brand name, branding strategies enables the business firm(s) to effectively tap the various market segments.

Business firms can use either undifferentiated marketing strategy or differentiated marketing strategy. However with the changing needs, wants, taste and preference of consumers with the influence of cultural, social and personal factors on consumer behavior, the marketing differentiated strategy with market segmentation, market targeting and market positioning with niche marketing strategy, customized marketing strategy, will be more appropriate and relevant. Markets across the globe have been splinting into more micro markets with each segment or group of consumers

requiring different marketing mix. Niche Marketing, one-to one marketing, customized marketing is becoming more prominent to better satisfy varying consumer wants and demands.

The usage of marketing strategy, product strategy depends on the attributes of product, market condition, customer requirements and a host of marketing factors. Product differentiation focuses on the core aspect of marketing mix called product mix. Product Mix is the set of all product lines and product items that a particular seller offer for sale to the buyers and includes line stretching decisions like upward stretch, downward stretch, two-way stretch, line pruning decision and line modernization decision. Product differentiation and product innovation including product adaptation are a necessary must to meet the varying requirements of the consumers located in different parts of the globe, with consumers product(s) requirement changing according to their nationalities, culture, differences in rural and urban product demands etc. to mention a few.

Product differentiation, Product innovation, Product adaptation, and branding decisions based on careful marketing planning, implementation and control is a necessary must to survive and grow in the globally competitive markets. Marketing Mix decisions are affected by needs, wants, taste and preferences of target market including their demographic, psychographic and behavioral characteristics. Niche Marketing and Customized Marketing strategy can also be pursued to better satisfy the needs, wants and demands of the consumers. Product differentiation, customized products including customized marketing are becoming prominent to serve the needs and wants of micro markets, market niches and consumer(s) with varying product(s) preferences.

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By:

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Basics of taxation

Income tax has always been a matter of great concern for all income earning individuals. All must be aware about basics of taxation. In this article, I have decided to cover some basic terms related to taxation. Taxation is not something new in India. This concept was introduced since the time of rulers in India. For doing betterment of society, for doing development activities, rulers have started to collect tax from farmers and other income earning individuals. Britishers have also started this practice of collecting tax from public (All of you must have seen movie- Lagan, in this regard). At present, the income tax act, 1961 is dealing with matters related to income tax.

Understanding of the following terms are important as defined in the income tax act:

Person:

Every individual, Hindu undivided family, company , association of persons like joint venture, firms , local body and any other artificial juridical person are included in the meaning of person.

Assessee:

Every person who is liable to pay tax or any other amount in form of interest or penalty etc. is known as an assessee. Thus every assessee must be a person but every person cannot be an assessee. The person who is not liable to pay tax cannot be considered as an assessee.

Assessment:

Assessment is a procedure carried out by income tax authority to verify residential status of the assessee, total taxable income of an assessee and tax liability payable by an assessee for the previous year. Assessee

Assessment year:

It is period of 12 months commencing on 1st April and ending on 31st March. During this year, income of the accounting year which has got over will be assessed by the income tax department.

Previous year:

The year preceding the assessment year is known as previous year. It is also known as accounting year or income year. It is a period of 12 months starting from 1st April and ending on 31st March. For the purpose of income tax act, it is compulsory to have duration of the year from April to March only. No other period of 12 months can be allowed by the income tax act for the meaning of previous year.

Gross total income:

For the purpose of this act, income has been classified among income from salary, from business or profession , house property , capital gain and other sources . Total gross income is aggregation of income from all heads.

Total income:

To arrive at the total income, from gross total income permissible deductions are to be adjusted. On this total income only tax liability will be determined.

By:

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Assistant Professor

SEMCOM

BITS & BYTES

E-Certificate

Introduction

An Issue of an E-certificate to qualified candidates is new trend adapted by many educational and business organizations. The most prominent advantage of e-certificate is fast delivery. It can be delivered through mail services such as Yahoo-Mail, through messaging services such as WhatsApp or through organization's Website. While using website, appropriate security mechanism may be implemented.

E-Certificates are issued via electronic files (usually, PDF), with digital signatures issued by a third party trusted organization. The digital signature certifies that the electronic file has not been altered in any way during storage and transmission.

The System

The organization needs to maintain database for all certificates issued by them and their websites must support two main functionalities: (i) Downloading of Certificates by the person to whom it is issued after verifying his/her credentials and (ii) Certificate verification by any stakeholder/third party using some unique tracking number.

E-Certificate Issue Process uses the following features.

- Unique E-certificate Tracking Number (protects counterfeiting of documents)
- Protection from modification using electronic/digital signature/security certificate issued and held by an accredited certificate authority (protects document from being altered)
- Photo of candidate/owner to whom certificate is issued
- Ability to access and print an electronically stored certificate by owner through organization's website at anytime from anywhere (Requires credentials checking).

E-certificate Verification process is very simple and can be implemented with one or more of following approaches.

- Online verification system. The verifier can contact certificate issuer's website to check genuineness of certificate. No password or user ID may be required for verification. The unique certificate number and/or Tracking ID are sufficient.
- The verifier can get reply instantly by scanning QR Code.


Select type of Certificate; Regular (CCC/BCC/NDLM & O/A/B/C etc) ; Moduler (only O/A//B/C module wise)	
<input type="radio"/> Regular Certificate	<input checked="" type="radio"/> Moduler Certificate
Course For	Select.....
Course Module	Select....
Registration_No.	
Student DOB [DD/MM/YYYY]	
Captcha Image	
Captcha Code	
<input type="button" value="SUBMIT"/> <input type="button" value="REFRESH"/>	
Verify Code via Email OR SMS	
Get Verification code on	<input checked="" type="radio"/> E-Mail <input type="radio"/> Mobile
Your 10 digit Mobile Number	<input type="text"/> <input type="button" value="Send SMS"/>
Verification Code (OTP)	<input type="text"/>
<input type="button" value="SUBMIT"/>	

Figure: Sample Certificate Download Webpage

Disadvantages of Paper Certificates

- Process of printing is lengthy and costly.
- Risk of certificate loss and damaged during storage and delivery.
- Security issues: It is difficult to identify the originality of paper certificates. It suffers from the problems such as fake documents, alteration of fact, and impersonation.
- In some domain, problem is that there appears to be no consistent certificate format or approach to verifiable features, making it extremely difficult to verify a document's authenticity.

Advantages of E-Certificate

- **To Organization**
 - Easy and fast issue of certificate
 - Reduces the paper usage
 - Easy to correct the mistakes
 - Cost effective: Compared to traditional hard copy issuing system softcopy issuing system will take low cost
- **To Owner**
 - Easy to get: Owner can download their certificates from anywhere at any time. It will save the time, money, and energy of the owners
 - Easier to manage and reduced risk of loss, stealing or damage during transfer and storage
 - No need to attach the documents (when demanded). For example, Owner can mention only their certificate numbers in applications instead of attaching them to applications.

It will save application cost and also helps recruiters to easily verify the documents online

- **To Verifier**
 - Minimizes the time required in certificate verification. E-Certificates are issued via secured electronic files and allow users to verify its authenticity quickly
- **To Society**
 - Reduces the problem of fake documents
 - Environment friendly approach. Digitization of paper documents leads to paperless system and saves environment
 - Easy verification: Anybody can easily verify the documents online. Saves time, money, and energy in verification.

Challenges in Implementation

The challenge is not a technological one, but an acceptance by the people and that of engagement and adapting to business process change. The people need to train how to use it so that they can trust it.

Conclusion

Full engagement with e-Certification can improve the process of issuing and verification of certificates and provides several benefits to all stakeholders.

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By:

Dr. Kamlesh Vaishnav

Associate Professor

SEMCOM

Web InfoTech:

RTLS (Real Time Location System)

- Real Time Location System (RTLS) allow you to locate people or things in real time, enables you to track, manage and analyze information regarding where assets or people are located.
 - ✓ Assets are like vehicles, machinery, projectors and other equipment's.
 - ✓ Track people and objects at local, national or even global level.

- How RTLS works?
 - ✓ It's a RFID (Radio Frequency Identification) Solution, IoT (The Internet of Things) solution that manages Sensors and Actuators.

- What is RFID?
 - ✓ RFID (Radio Frequency Identification) belongs to AIDC(Automatic identification and Data Capture) methods automatically finds Assets or People, collect information from them and send that data directly to computer system by using middleware software.

- What is IoT?

IoT(Internet of Things) is a physical objects – assets like laptop, home appliances and other electronic equipment's that use sensors and middleware software to connect and exchange data over internet.

- **How it Works?**
 - ✓ Tags: Active tags that usually a mobile device enabled with location technology, so you can attach it with any equipment
 - ✓ Location Sensor: It's a location enabled device. You can use location sensor for track tags that are affix with equipment. You can use different type of sensor like Motion Sensor, Temperature Sensor and Carbon Monoxide sensor.
 - ✓ Location Engine: software which communicates between Location Sensor and Tags, location engine then send the information to Middleware application.

- ✓ Middleware Application: Software and application which work inside the RTLS Technology and the Enterprise applications capable of mining the value information technology.
- ✓ Application: End user software application which interact with RTLS middleware software.
- ✓ The location engine, middleware and application software run on different computers or on same computers, these application provide a user Interface

➤ **Application of RTLS:**

- ✓ Tracking Assets: RFID Technology use for tracking assets, we need to know where this equipment is right away.
- ✓ Managing Inventory: RFID technologies are widely used for Inventory and assets tracking. we can track the record on stock available in warehouse
- ✓ Complying Legally: we can prove the current location of person.
- ✓ Personnel tracking: different technologies are used for on-site Employees and workers location tracking.

By:

Mr. Bhaumik Shah

Trainee Teacher

SEMCOM

ARTICLE:

Waste Management of Domestic Use

Waste Management is the process of treating solid wastes. It is a multidisciplinary approach because it offers multiple solutions for recycling items that do not belong to garbage. Waste management disposes of all those products and substances which are either old, been utilized or of no use.ⁱ

Day by day, the problem of waste management is worsening all over the world and even in the space (space junk/space debris). To manage waste, each and every aspect starting from its foundation/manufacturing to its final disposal need to be taken care of. Waste can be of three forms such as solid, liquid and gaseous. Among these three, solid waste is less dangerous compare to liquid and gaseous waste. Liquid and gaseous waste is mostly released by commercial and industrial units. The process of waste management involves collection, transport, treatment and finally, a proper method of disposal or removal. Depending upon the type of waste (household, industrial, electronic (e-waste) and biological), its disposal technique may vary. Moreover, options may differ with organizational preference, their own or known experience. Disposal method always require clear idea to address such as regarding cost of disposing off, potential complexity involved, perfect solution, society and environmental considerations at a large.

Waste Management in India

National Solid Waste Association of India (NSWAI), formed on January 25, 1996, is the only prominent professional non-profit organization. This organization executes disposing off solid waste including hazardous, toxic and biomedical waste as well. In India, 'The new Municipal Solid Waste Management Rules 2000'ii, which came into effect from January 2004, failed, even to manage waste in a cyclic process. Hence, in 2016, Indian Government has launched online application to track the status of various types of wastes generated in the country. Furthermore, many cities through partnerships and alliances with private initiatives had already taken individual efforts for the collection of segregated waste and for its disposal. These alliances may be between community-public, public-private and private-private arrangements. Municipal Solid Waste also requires a strong social contract between Municipality and Community. The best example of this can be seen recently in Ahmedabad. As City Municipal Corporation has started practice of collecting segregated dry and wet waste only. This practice has also gain community support. It can reduce lots of time and efforts for its clearance process.

Municipal corporations of India play vital role in waste management along with public health department. Municipal solid waste holds around 75 percent of the total waste created in the country. But majority from that remains untreated. The public health department is accountable to maintain cleanliness across the city, hygiene and epidemic control as well as for food adulteration. The entire process of solid waste management system is performed under four headings namely, street

cleansing, waste collection, transportation and disposal. The cleansing and collection operations are conducted by the public health department of city Municipality Corporation, while transportation and disposal of waste are carried out by the transportation department of city Municipality Corporation.

Like other developing countries, India too, is finding a solution to recover from waste management issues. According to a report by Enincon Consulting Company (2018)iii, India generates 1,00,000 Metric Tonnes of waste per day. The total waste generation in India presently hovers around 60-65 Metric Tonnes per annum, and out of that only 20 percent is actually treated. Looking at the present situation, it can be projected that India has a potential to generate approximately 90 Million Tonnes of waste per year by 2030-2032.

Gloomily, waste management in India mostly means a gathering waste from residential and industrial areas and dumping it at landfill sites. This approach has to be reformed or else India will face acute snags in upcoming years. According to Enincon Consulting report (2018)ii, by 2025, the market size of waste management in India is estimated to be worth 14 Billion dollars with an annual growth of around 7 percent.

Disposal Methods:

There are eight different methods of waste management such as animal feeding, source reduction and reuse, composting, recycling, fermentation, landfills, land application and incineration. Out of them, recycling and fermentation procedure required to be done at factory units. While rest of the methods can be applied at individual level.

According to European Union Waste Framework Directive (2008)iv, the following order should be maintained for the management of waste unit: reduce–reuse–recycle–recover–landfill. Here, Reduce means minimized use products and reuse means products should be reused as they are or product materials should be recycled. If this is not possible, waste should be recovered for energy. It is a good alternative for using fossil fuels or harvesting biological materials. The last option for waste management is to dump the waste in a landfill. Landfilling is a least favourable option as it requires large land areas and it pollutes the site environment by discharging of polluted water and poisonous gas.

Figure1. Waste Management Hierarchy



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